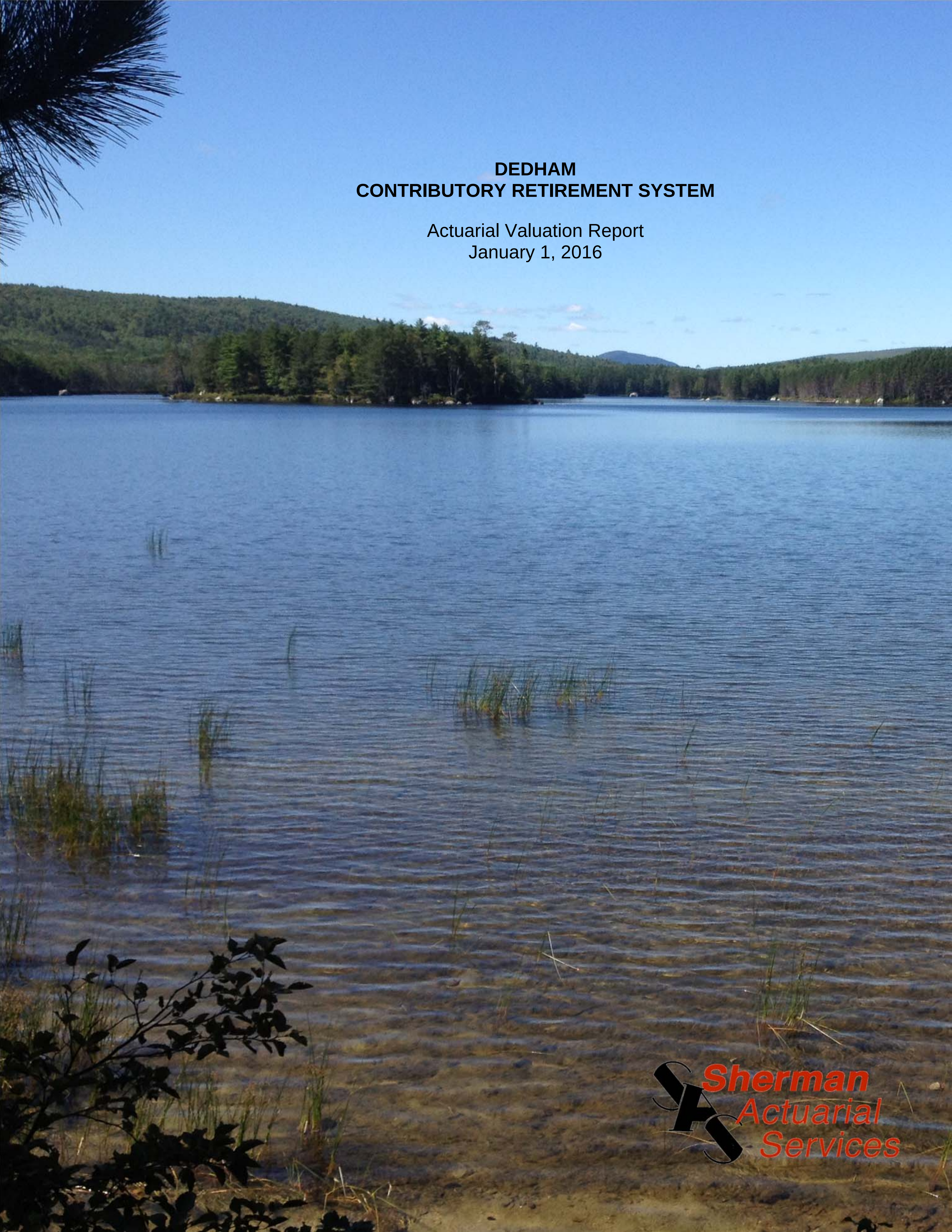
DEDHAM
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report
January 1, 2016



Sherman Actuarial Services

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Report Summary:

Highlights	**January 1, 2014**	**January 1, 2016**
Contributions		
Funding Schedule FY 2017	$4,694,092	$4,694,092
Funding Schedule FY 2018	4,862,738	5,031,923
Funded Ratios		
GAS No. 25	80.2%	85.8%
Participants		
Actives	424	440
Retirees and Beneficiaries	266	275
Inactives	119	121
Disabled	54	56
Total	863	892
Payroll		
Payroll of Active Members	$20,523,383	$22,457,073
Average Payroll	48,404	51,039
Normal Cost		
Employer	1,077,411	1,041,818
Employee	1,773,213	2,002,265
Administrative Expenses	200,000	200,000
Total	3,050,624	3,244,083
Actuarial Accrued Liabilities		
Actives	54,139,579	54,113,519
Retirees, Beneficiaries, Disabilities and Inactives	70,792,161	78,841,200
Total	124,931,740	132,954,719
Actuarial Value of Assets	100,195,465	114,097,658
Unfunded Actuarial Accrued Liabilities	$24,736,275	$18,857,061

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2016, of Dedham Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2016.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Town of Dedham Contributory Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2016.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The cost of these benefits has been assumed by the State under Proposition Two and One-Half.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last year, the total unfunded actuarial accrued liability decreased by 23.7% to $18,857,061. The decrease is the result of net unfavorable actuarial experience during the preceding years and a change in actuarial assumptions. The sources of actuarial (gains) and losses are as follows:

Assets	(1,881,862)
Salary Increases	553,207
New Participants	1,443,906
Active - Retirements	(1,848,729)
Active - Terminations	533,574
Active - Mortality	242,663
Active - Disabilities	589,951
Inactive - Mortality and data adjustments	1,503,537
Other, includes data adjustments, buybacks, interest on ASF	(7,790)
Total Actuarial (Gain) / Loss	1,128,457
Change in Actuarial Assumptions	(4,100,558)

Actuarial Costs and Liabilities:

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability, and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

Table I

	January 1, 2014	January 1, 2016
Superannuation	$1,872,187	$1,910,567
Termination	224,651	498,059
Death	188,819	223,477
Disability	564,967	411,980
Administrative Expenses	200,000	200,000
Total Normal Cost	3,050,624	3,244,083
% of Pay	14.9%	14.4%
Employee Contributions	1,773,213	2,002,265
% of Pay	8.6%	8.9%
Employer Normal Cost	$1,277,411	$1,241,818
% of Pay	6.2%	5.5%

Present Value of Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

Table II

	January 1, 2014	January 1, 2016
Actives		
Superannuations	$48,897,382	$51,791,745
Termination	848,029	(1,536,000)
Death	1,636,226	1,824,031
Disability	2,757,942	2,033,743
Retirees and Inactives		
Retirees and Beneficiaries	54,454,651	59,075,355
Terminated (Refund)	604,232	878,396
Disabled	15,733,278	18,887,449
Total	$124,931,740	$132,954,719

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Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

Table III

	January 1, 2014	January 1, 2016
Actives		
Superannuation	$63,967,128	$67,987,469
Termination	$1,751,035	2,477,953
Death	$3,138,846	3,624,314
Disability	$7,867,446	5,968,029
Retirees and Inactives		
Retirees and Beneficiaries	$54,454,651	59,075,355
Terminated (Refund)	$604,232	878,396
Disabled	$15,733,278	18,887,449
Total	$147,516,616	$158,898,965

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Funded Status and Appropriations:

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV

	January 1, 2014	January 1, 2016
Cash equivalents	$313,760	$156,639
Short term investments	0	0
Fixed income securities	0	0
Equities	105,057,671	109,190,248
International	0	0
Real Estate	0	0
Venture Capital	0	0
Other	0	0
Accounts receivable	6,009	71,125
Accounts payable	0	(5,554)
Accrued income	0	0
Total Market Value	$105,377,440	$109,412,458
Total Actuarial Value	$100,195,465	$114,097,658

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Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (8.0%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a four year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 10%. The calculation of the actuarial value of assets as of January 1, 2016 is presented in Table V.

Table V

		January 1, 2016
(1)	Market value at January 1, 2015	$110,721,622
(2)	2015 Contributions	$7,511,233
(3)	2015 Payments	($9,526,117)
(4)	Net interest adjustment at 8.0% on (1), (2), and (3) to December 31, 2015	$8,777,135
(5)	Expected market value on January 1, 2016 (1) + (2) + (3) + (4)	$117,483,873
(6)	Actual market value on January 1, 2016	$109,412,458
(7)	2015 (Gain) / Loss	$8,071,415
(8)	75% of 2015 (Gain) / Loss	$6,053,562
(9)	2014 (Gain) / Loss	$416,724
(10)	50% of 2014 (Gain) / Loss	$208,362
(11)	2013 (Gain) / Loss	($6,306,895)
(12)	25% of 2013 (Gain) / Loss	($1,576,724)
(13)	Actuarial value on January 1, 2016, (6) + (8) + (10) + (12) but not less than 90% nor greater than 110% of (6)	$114,097,658
(14)	Ratio of actuarial value to market value	104.28%
(15)	Actuarial Value Return for 2014	9.23%
(16)	Actuarial Value Return for 2015	8.85%
(17)	Market Value Return for 2014	7.60%
(18)	Market Value Return for 2015	0.64%

Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

Table VI

	January 1, 2014	January 1, 2016
Actuarial Accrued Liability	$124,931,740	$132,954,719
Actuarial Assets	100,195,465	114,097,658
Unfunded Actuarial Accrued Liability	$24,736,275	$18,857,061
Funded Status	80.2%	85.8%

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Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Section 22D of Chapter 32 of the Massachusetts General Laws, and Chapter 188 of the Acts of 2010, An Act Relative to Municipal Relief. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2022
  $ 18,821,992 over 6 years with 4.5% increasing payments
- Increasing amortization of the 2002 Early Retirement Incentive unfunded liability by June 30, 2019
  $ 35,069 over 3 years
- Interest adjustment for payments made in July

The pension appropriation is shown in Table VII.

Table VII

	January 1, 2014	January 1, 2016
Normal cost	$1,277,411	$1,241,818
Amortization payment of unfunded accrued liability	2,907,955	3,381,995
Amortization payment of 2002 ERI liability	12,600	12,572
Total cost	$4,197,966	$4,636,385
% of Pay	20.5%	20.6%
Fiscal 2017 cost	$4,694,092	$4,694,092
Fiscal 2018 cost	$4,862,738	$5,031,923

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 4.0% per year. The employee contribution rate is expected to increase to 10.5% by 2039 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 6 years until the unfunded liabilities are completely paid off, at which time only the normal cost will remain. The total cost represents about 21.5% of payroll, decreasing to about 5.3% by the time the unfunded liabilities are fully paid off, leaving only a long term normal cost of 4.5% thereafter. The decrease in the cost as a percentage of payroll is a result of the increase in member deductions.

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Appropriation Forecast

Fiscal Year Ending	Payroll*	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %**
2017	$22,457,073	$2,002,265	$1,289,041	$3,405,051	$4,694,092	20.9	85.7
2018	$23,355,356	$2,099,172	$1,323,147	$3,708,776	$5,031,923	21.5	87.6
2019	$24,289,570	$2,200,628	$1,357,918	$3,875,084	$5,233,002	21.5	89.8
2020	$25,261,153	$2,306,841	$1,393,355	$4,035,825	$5,429,180	21.5	92.1
2021	$26,271,599	$2,418,031	$1,429,454	$4,217,437	$5,646,891	21.5	94.6
2022	$27,322,463	$2,534,425	$1,466,212	$4,407,222	$5,873,434	21.5	97.2
2023	$28,415,362	$2,656,261	$1,503,622	$0	$1,503,622	5.3	100.0
2024	$29,551,976	$2,783,789	$1,541,680	$0	$1,541,680	5.2	100.0
2025	$30,734,055	$2,917,270	$1,580,377	$0	$1,580,377	5.1	100.0
2026	$31,963,417	$3,056,975	$1,619,703	$0	$1,619,703	5.1	100.0
2027	$33,241,954	$3,203,189	$1,659,646	$0	$1,659,646	5.0	100.0
2028	$34,571,632	$3,356,208	$1,700,193	$0	$1,700,193	4.9	100.0
2029	$35,954,497	$3,516,344	$1,741,329	$0	$1,741,329	4.8	100.0
2030	$37,392,677	$3,683,921	$1,783,035	$0	$1,783,035	4.8	100.0
2031	$38,888,384	$3,859,278	$1,825,291	$0	$1,825,291	4.7	100.0
2032	$40,443,920	$4,042,770	$1,868,075	$0	$1,868,075	4.6	100.0
2033	$42,061,677	$4,234,766	$1,911,362	$0	$1,911,362	4.5	100.0
2034	$43,744,144	$4,435,653	$1,955,122	$0	$1,955,122	4.5	100.0
2035	$45,493,909	$4,645,835	$1,999,325	$0	$1,999,325	4.4	100.0
2036	$47,313,666	$4,865,735	$2,043,936	$0	$2,043,936	4.3	100.0
2037	$49,206,212	$5,095,794	$2,088,917	$0	$2,088,917	4.2	100.0
2038	$51,174,461	$5,336,472	$2,134,226	$0	$2,134,226	4.2	100.0
2039	$53,221,439	$5,588,251	$2,179,817	$0	$2,179,817	4.1	100.0
2040	$55,350,297	$5,811,781	$2,267,010	$0	$2,267,010	4.1	100.0
2041	$57,564,309	$6,044,252	$2,357,690	$0	$2,357,690	4.1	100.0
2042	$59,866,881	$6,286,023	$2,451,998	$0	$2,451,998	4.1	100.0
2043	$62,261,556	$6,537,463	$2,550,078	$0	$2,550,078	4.1	100.0
2044	$64,752,019	$6,798,962	$2,652,081	$0	$2,652,081	4.1	100.0
2045	$67,342,099	$7,070,920	$2,758,164	$0	$2,758,164	4.1	100.0
2046	$70,035,783	$7,353,757	$2,868,491	$0	$2,868,491	4.1	100.0
2047	$72,837,215	$7,647,908	$2,983,231	$0	$2,983,231	4.1	100.0
2048	$75,750,703	$7,953,824	$3,102,560	$0	$3,102,560	4.1	100.0

* Calendar basis

** Beginning of Fiscal Year

GASB Statements No. 25 and No. 27

Effective for periods beginning after June 15, 1997, the Governmental Accounting Standards Board (GASB) requires the disclosure of pension related liabilities for public employer financial statements in accordance with Statements 25 and 27. These statements, which replace GASB Statement No. 5, must be adhered to by any public employee retirement system that follows Generally Accepted Accounting Principles (GAAP).

These disclosures are intended to establish a reporting framework that distinguishes between:

- current financial information about plan assets and financial activities,
- actuarially determined information from a long-term perspective,
- the funded status of the plan, and
- progress being made in accumulating sufficient assets to pay benefits when due.

Footnote disclosures required by GASB Statement No. 25 and 27 include a description of the plan, a summary of significant accounting policies, and information about contributions, legally required reserves, and investment concentrations. As a result of the oversight of the Public Employees Retirement Administration Commission (PERAC) and the conversion of unpaid contributions to pension related debt, the Net Pension Obligation (NPO) as required by Statement No. 27 will effectively always be equal to $0. The required disclosure information is shown in Table VIII.

Table VIII

		January 1, 2014	January 1, 2016
(1)	Actuarial Accrued Liability	$124,931,740	$132,954,719
(2)	Actuarial Value of Assets	100,195,465	114,097,658
(3)	Unfunded Actuarial Accrued Liability	24,736,275	18,857,061
(4)	Funded Ratio (2)/(1)	80.2%	85.8%
(5)	Covered Payroll	$20,523,383	$22,457,073
(6)	UAAL as a percentage of payroll: (3)/(5)	120.5%	84.0%
(7)	Annual Required Contribution (ARC)	$4,277,700	$4,694,092
(8)	Net Pension Obligation	$0	$0

EXHIBITS

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Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2016

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
20-24	19	0	0	0	0	0	0	0	0	19
	28,072	0	0	0	0	0	0	0	0	28,072
25-29	40	6	0	0	0	0	0	0	0	46
	38,737	44,500	0	0	0	0	0	0	0	39,489
30-34	23	10	1	0	0	0	0	0	0	34
	42,622	58,917	54,727	0	0	0	0	0	0	47,771
35-39	10	10	12	3	0	0	0	0	0	35
	39,478	59,844	69,054	79,957	0	0	0	0	0	58,907
40-44	6	2	10	11	1	0	0	0	0	30
	28,021	55,745	66,629	68,055	60,291	0	0	0	0	58,494
45-49	24	13	11	11	10	3	0	0	0	72
	40,182	48,104	53,433	79,529	79,735	95,972	0	0	0	57,466
50-54	15	11	16	11	4	11	3	0	0	71
	37,832	30,240	48,029	58,784	81,203	76,804	59,942	0	0	51,615
55-59	5	3	15	12	9	7	11	1	0	63
	35,706	26,581	38,158	59,483	62,230	60,954	83,195	112,700	0	56,493
60-64	5	10	10	7	6	5	3	2	0	48
	32,709	39,608	34,723	57,028	56,874	40,693	88,376	66,413	0	46,848
65-69	2	1	2	4	1	6	1	1	0	18
	39,764	21,353	51,479	54,268	63,441	49,269	60,471	68,393	0	50,490
70+	0	0	2	1	1	0	0	0	0	4
	0	0	35,265	24,217	52,905	0	0	0	0	36,913
Total Employees	149	66	79	60	32	32	18	4	0	440
Average Salary	37,446	45,777	50,620	64,403	68,754	64,329	78,921	78,480	0	51,039

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Exhibit 2 - Retiree Distribution as of January 1, 2016

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	0	0	0	0	0
45-49	0	0	0	0	0	0
50-54	2	2	4	17,368	60,032	77,401
55-59	3	6	9	66,350	231,210	297,560
60-64	14	12	26	190,762	582,558	773,320
65-69	21	29	50	407,176	1,406,459	1,813,635
70-74	13	22	35	313,205	732,102	1,045,307
75-79	25	28	53	460,594	902,401	1,362,995
80-84	16	15	31	225,384	371,509	596,892
85-89	23	15	38	313,756	259,818	573,574
90-94	13	9	22	128,523	163,380	291,903
95+	5	3	8	46,067	6,575	52,642
Total	135	141	276	2,169,185	4,716,045	6,885,229
Average (Age/Payment)	77.36	75.57	76.44	16,068	33,447	24,946
Frequency Percent	48.9	51.1	100.0	31.5	68.5	100.0

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Exhibit 3 - Disabled Retiree Distribution as of January 1, 2016

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	0	0	0	0	0
45-49	0	1	1	0	6,158	6,158
50-54	1	1	2	44,230	63,253	107,483
55-59	2	10	12	83,190	497,177	580,366
60-64	0	4	4	0	163,121	163,121
65-69	0	10	10	0	315,886	315,886
70-74	1	13	14	32,463	439,748	472,211
75-79	0	8	8	0	240,807	240,807
80-84	0	1	1	0	16,603	16,603
85-89	0	3	3	0	99,157	99,157
90-94	0	1	1	0	11,737	11,737
95-99	0	0	0	0	0	0
Total	4	52	56	159,883	1,853,646	2,013,529
Average (Age/Payment)	60.7	69.2	68.6	39,971	35,647	35,956
Frequency Percent	7.1	92.9	100.0	7.9	92.1	100.0

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EXHIBIT 4 - CASHFLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net change in plan assets
2016	$10,360,216	$2,002,265	$4,694,092	$8,680,697	$5,016,838
2017	9,739,389	2,099,172	5,031,923	8,982,808	6,374,514
2018	9,971,206	2,200,628	5,233,002	9,474,611	6,937,035
2019	10,251,590	2,306,841	5,429,180	10,007,988	7,492,419
2020	10,601,350	2,418,031	5,646,891	10,582,602	8,046,174
2021	10,906,235	2,534,425	5,873,434	11,202,192	8,703,816
2022	11,249,859	2,656,261	1,503,622	11,695,178	4,605,202
2023	11,603,020	2,783,789	1,541,680	12,039,075	4,761,525
2024	11,896,938	2,917,270	1,580,377	12,397,389	4,998,099
2025	12,169,303	3,056,975	1,619,703	12,774,910	5,282,285
2026	12,472,133	3,203,189	1,659,646	13,173,353	5,564,055
2027	12,754,545	3,356,208	1,700,193	13,594,469	5,896,325
2028	13,056,661	3,516,344	1,741,329	14,040,650	6,241,662
2029	13,352,309	3,683,921	1,783,035	14,513,909	6,628,556
2030	13,654,651	3,859,278	1,825,291	15,016,969	7,046,888
2031	13,963,839	4,042,770	1,868,075	15,552,266	7,499,272
2032	14,280,028	4,234,766	1,911,362	16,122,437	7,988,537
2033	14,603,377	4,435,653	1,955,122	16,730,340	8,517,739
2034	14,934,047	4,645,835	1,999,325	17,379,070	9,090,182
2035	15,272,205	4,865,735	2,043,936	18,071,976	9,709,441
2036	15,618,021	5,095,794	2,088,917	18,812,686	10,379,377
2037	15,971,666	5,336,472	2,134,226	19,605,128	11,104,160
2038	16,333,320	5,588,251	2,179,817	20,453,552	11,888,301
2039	16,703,162	5,811,781	2,267,010	21,361,042	12,736,671
2040	17,081,379	6,044,252	2,357,690	22,333,971	13,654,534
2041	17,468,160	6,286,023	2,451,998	23,377,716	14,647,577
2042	17,863,699	6,537,463	2,550,078	24,498,099	15,721,941
2043	18,268,194	6,798,962	2,652,081	25,701,414	16,884,263
2044	18,681,849	7,070,920	2,758,164	26,994,471	18,141,706
2045	19,239,548	7,353,757	2,868,491	28,379,512	19,362,212

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2016, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

(i) Group 1: Most general employees in State and local government

(ii) Group 2: Certain specified hazardous duty positions

(iii) Group 3: State police officers and inspectors

(iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. **Salary**

Salary is defined as gross regular compensation. Salary does not include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. **Member Contributions**

Member contributions vary depending upon date hired as follows:

Date of Hire	**Member Contribution Rate**
Prior to 1975	5.0% of Salary
1975 to 1983	7.0% of Salary
1984 to 1996	8.0% of Salary
1996 and Later plus	9.0% of Salary
1979 and Later	2.0% of Salary in excess of $30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. **Average Salary**

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. **Creditable Service**

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. **Service Retirement**

a. Eligibility:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

(i) completion of 20 years of service

(ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member

(iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service

(iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

Age at Retirement	Percentage of Average Salary Group 1	Group 2	Group 4
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
54	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.001	.001	.001

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

Age at	Percentage of Average Salary		
Retirement	Group 1	Group 2	Group 4
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at	Percentage of Average Salary		
Retirement	Group 1	Group 2	Group 4
67 or Over	.02500	.02500	.02500
66	.02375	.02500	.02500
65	.02250	.02500	.02500
64	.02125	.02500	.02500
63	.02000	.02500	.02500
62	.01875	.02500	.02500
61	.01750	.02375	.02500
60	.01625	.02250	.02500
59		.02125	.02500
58		.02000	.02500
57		.01875	.02500
56		.01750	.02375
55		.01625	.02250
54			.02125
53			.02000
52			.01875
51			.01750
50			.01625

8. Deferred Vested Retirement

a. Eligibility:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions, with interest.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus $450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. Eligibility:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of $250 per month to the surviving spouse, plus $120 for the first child, plus $90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of $250 per month plus $120 for the first child and $90 for each additional child.

c. Refund of Contributions:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. Cost-of-Living Increases

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is $16,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

(i) Option A – Life annuity

(ii) Option B – Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member

(iii) Option C – Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 6 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

1. **Member Data**

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. **Valuation Date**

January 1, 2016.

3. **Actuarial Cost Method**

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. **Rate of Investment Return**

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.75% per annum.

5. **Salary Scale**

It is assumed that salaries including longevity will increase at a rate of 4.0% per year.

6. **Cost-of-Living Increases**

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and $15,000 per year.

7. **Value of Investments**

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a four-year smoothing of asset returns greater than or less than the assumed rate of return.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

Service	General Employees	Police and Fire Employees
0	0.2080	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
30	0.0000	0.0000

9. Annual Rate of Mortality

It is assumed that both pre-retirement mortality and beneficiary mortality is represented by the RP-2014 Blue Collar Mortality with Scale MP-2014, fully generational. Mortality for retired members for Group 1 and 2 is represented by the RP-2014 Blue Collar Mortality Table set forward five years for males and 3 years for females, fully generational. Mortality for retired members for Group 4 is represented by the RP-2014 Blue Collar Mortality Table set forward three years for males, and six years for females, fully generational. Mortality for disabled members for Group 1 and 2 is represented by the RP-2000 Mortality Table set forward six years. Mortality for disabled members for Group 4 is represented by the RP-2000 Mortality Table set forward two years. Generational adjusting is based on Scale MP-2014.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.00000
66	0.2682	0.1959	1.00000
67	0.2500	0.2000	1.00000
68	0.2500	0.2000	1.00000
69	0.2500	0.2000	1.00000
70 to 76	0.2500	0.2500	1.00000
77 to 79	0.3500	0.2500	1.00000
80	1.0000	1.0000	1.00000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	0.2500
66	0.1224	0.1038	0.3000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70 to 76	0.2615	0.1939	1.0000
77 to 79	0.2682	0.1959	1.0000
80	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained Age	General Employees	Police and Fire Employees
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 20% of all disabilities are ordinary (80% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2016 is $200,000 and is anticipated to increase at 4.0% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. Actuarial Accrued Liability

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

3. Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. Actuarial Present Value

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. Forecast

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

6. Normal Cost

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

7. Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

8. Valuation Method

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

9. Vested Liability

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

CERTIFICATION:

This report fairly represents the actuarial position of the Town of Dedham Retirement System contributing as of January 1, 2016, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC

Daniel W. Sherman

Daniel W. Sherman, ASA, MAAA

June, 2016

BREAKOUTS

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Breakouts - Actuarial Based

	Total	All Others	Housing
(1) Participants			
(a) Actives	440	425	15
(b) Inactives	254	254	0
(c) Retirees	275	267	8
(d) Disabled Retirees	56	56	0
(e) Total	892	869	23
(2) Payroll of Active Participants	$ 22,457,073	$ 21,594,279	$ 862,794
(3) Normal Cost			
(a) Total Normal Cost	3,044,083	2,945,269	98,814
(b) Expected Employee Contributions	2,002,265	1,925,816	76,449
(c) Administrative Expenses	200,000	194,843	5,157
(d) Net Employer Normal Cost (a) - (b) + (c)	1,241,818	1,214,296	27,522
(4) Actuarial Accrued Liability	132,954,719	129,225,536	3,729,183
(5) Assets*	114,097,658	110,897,388	3,200,270
(6) Unfunded Actuarial Accrued Liability (4) - (5)	18,857,061	18,328,148	528,913
(7) Amortizations*	3,394,567	3,287,135	107,432
(8) Total Required Employer Contributions (3d) + (7)	4,636,385	4,501,431	134,954
(9) Fiscal 2017 Cost	$4,694,092	$4,557,459	$136,634
Percentage of Total Cost	100.00%	97.09%	2.91%
(10) Fiscal 2018 Cost	$5,031,923	$4,885,456	$146,467
Percentage of Total Cost	100.00%	97.09%	2.91%
(11) Fiscal 2019 Cost	$5,233,002	$ 5,080,682	$ 152,320
Percentage of Total Cost	100.0%	97.09%	2.91%

* Allocation is based on the ratio of the Unfunded Actuarial Accrued Liability